



A.D. 1862, *24th JUNE.* N^o 1858.

S P E C I F I C A T I O N

OF

WILLIAM CLARK.

TRUSSES AND PESSARIES.

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Trusses and Pessaries.

(This Invention received Provisional Protection only.)

PROVISIONAL SPECIFICATION left by William Clark at the Office of the Commissioners of Patents, with his Petition, on the 24th June 1862.—A communication from abroad by Pierre Ferdinand Le Blanquais, of 29, Boulevard St. Martin, Paris, Surgical Bandage Maker.

5 I, WILLIAM CLARK, of 53, Chancery Lane, in the County of Middlesex, Engineer and Patent Agent, do hereby declare the nature of the said Invention for “**IMPROVEMENTS IN HERNIAL AND OTHER ORTHOPEDIC APPARATUS, AND IN PESSARIES AND OTHER INSTRUMENTS,**” to be as follows:—

10 All the different systems of trusses in use to the present day have been in some way or other objectionable. In some cases the parts project too much, owing to the various mechanical devices made use of in their construction, which proves incommodious to the wearer when sitting down; they are, besides, either too apparent outwardly, or liable to jerk, and to a cessation of pressure, whereby the wearer is either too much or too little compressed, causing in the
15 first case great pain, whilst in the second case the hernia would break out afresh.

Further many improvements have been obtained separately in certain apparatus, but the difficulty of combining the mechanical movements necessary for a perfect application, viz., thirteen movements for a plain truss and twenty for a
20 complex one, has never been surmounted, at the same time all these movements

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should be hid so as not to appear outwardly, and the apparatus is required to be at once very light and strong. After twelve years practice and investigation, I have discovered the best and most durable mechanical movements, which I have applied to the apparatus forming the object of the present application for Letters Patent. 5

I will proceed to describe these improvements, which I may apply to trusses, orthopedic apparatus, pessaries, and other surgical instruments.

Sheet 1, Fig. 1, shows a front view of the movements of the reversable pad; Fig. 2, a side view of the same; Fig. 3 is an under side view of the pad *a*, showing one of the movements separately. I will afterwards illustrate the 10 combination of movements of the entire mechanism. Fig. 5 shows separately the eccentric which operates the plate. In order to be effective, the reversing of the truss plate should take place by degrees, which can be obtained by mounting the end of the rod *c* in a guide formed on the plate, and by which a finger on the end of said rod is operated. The pin *x* passing through the 15 plate, moves in a groove formed therein, or it may move in the groove on the eccentric, the latter being rotated in any direction. A second means for obtaining the gradual reversal of the plate without any outward projection, is shown in Fig. 6, in under side view, while Fig. 7 shows a top view thereof; Figs. 8, 9, 10, 11, and 12, show, in detail, or separately, the parts made 20 use of to impart the movement. The rod *a*, to which is connected the spring *R*, derives a progressive movement from a rod *b*, which has between its forked parts or prongs a finger *c*, connected to the rod *a*, as shown in side view Fig. 8, and end view Fig. 9. The connecting rod *b* derives its movement from a part *d*, which is formed with teeth externally, while it has an 25 internal screw taking on the wormed part of the connecting rod *b*, and connected thereto by the part *F*. Figs. 10 and 11 show in elevation and section details of said parts, a disc *g* formed with holes *h*, Fig. 12, causes the nut *d* to rotate, and act successively upon the teeth of the part *d*, which enter the holes *h* in disc *g*, so that it suffices to move the latter by means of a knob *i*, 30 to slightly vary the inclination of the rod *a*, relatively to the truss carrying plate *m*, and thus ascertain the most suitable position for it, which has never been obtained hitherto by the jerking movements above alluded to. The holes *h* are sufficiently close to one another that when one of the teeth of nut *d* has escaped, another shall engage the next hole in its rotary motion. These teeth 35 cause the nut to move forward by degrees the screw which terminates the connecting the rod *b*, whereby the rod *a* is rotated, and yields the effect desired. A third movement, by which a gradual reversing is obtained without any part projecting externally, is shown in Fig. 13, which represents a plan

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of the movement, and in Fig. 14 showing an under side view of the same, Figs. 15, 16, 17, 18 and 19, showing the details thereof. This consists in engaging in a connecting rod *o*, the finger *k*, which operates the rod *s*, said rod *o* forming the collar of an eccentric *p*, which may be rotated either by
5 means a key *q*, seen in plan and elevation in Figs. 15 and 16, or by a ring, or in other suitable manner. In order to allow of the movement of finger *k*, the plate is formed with a slot *x*, and to secure the excentric *p*, which imparts the movement to the rod *o*, a plate *y* is fixed on plate *t*, which hides the whole movement as shown at Figs. 14 and 19. A fourth movement, by
10 which the reversal of the pad may be effected progressively without any outward projection, is shown in plan Fig. 1, Sheet 2, of the Drawing annexed at Fig. 2, in section and in plan at Fig. 3.

A is the truss or plate, of which the branch B receives its inclination through an excentric C, acting on the projecting part of D, in connection
15 with the rod B. The part D consists of a cam, which is constantly pressed against the excentric C by the spring F, so that said excentric in its rotation may force back the cam D, thereby causing the rod B provided with the supporting truss spring to rotate; this spring may be altogether dispensed with, and instead of a single cam a forked or complex cam may
20 be employed. A fifth mechanical movement, by which the progressive reversal of the pad can be obtained without any outward projection, is shown in Figs. 4, 5, and 6, wherein are seen the details of truss G in plan, section, and under side views. In this arrangement the inclined movement is imparted to the rod H by rotary motion imparted to the wormed rod J,
25 by a cranked part K; on turning this part K by means of the knobs I, I, the part L is caused to traverse the wormed rod J; the part L is furnished with a projecting part M in connection with rod H, thus by raising and depressing said part L the rod H is inclined as desired. A sixth mechanical movement, by means of which the progressive reversal of the pad is obtained
30 without any outward projection, is shown in Sheet 2, at Figs. 7, 8, and 9. Fig. 8 shows separately a detail of the part P, which effects the inclination of the truss rod Q; this movement is imparted by means of a key as shown, which key turns a part P furnished with a projection R on the axis of said part P in the form of a screw thread, or of other like form. The rod Q has a two-fold
35 projecting part S, which surrounds the projection R of the part P, from which arrangement it results that the part P, in its rotation, raises the part S, in consequence of the curved form of the part R, and hence effects the inclination of the spring carrying rod Q.

In the two last arrangements I have described the use of different appli-

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ances to those before described but producing the same results. As regards the fourth arrangement above described, the excentric is likewise different in its application, although it will be readily understood by reason of its simplicity. I claim the application of all movements above described whatever may be their position, size, and the material they are made of, and whatever be the form of the plates I should choose to apply. As I have before mentioned, mechanical arrangements have been already employed for reversing and inclining the pads, for lengthening and shortening the springs on the back part, for lengthening or strengthening the collar or neck, and for increasing or diminishing the pads so as to press back the intestines; but all these devices have been applied separately, and further, the movements obtained were produced by jerks and liable to stoppage, and had not that regularity and solidity required for being efficient; again, none of these movements can be compared to those I have described as regards simplicity and strength. Moreover, all the arrangements I apply are new to this day, and also the arrangements to be herein-after described, and which I claim as of this Invention. The most celebrated physicians will admit, for the reduction and cure of hernia, of no other application but that of a truss perfectly adjusted and fitted; but there lies the difficulty. Supposing, indeed, that an apparatus is obtained which at first fulfils all requirements, experience will prove that after a few months wear, owing to the effects of perspiration which oxidizes the steel parts, the energy and pressure required for an efficient reduction of the hernia will no longer exist; and there, indeed, lies the greatest danger. The patient, quite confident in the apparatus he is wearing, will not foresee the danger of exposing himself to daily labours, and it frequently happens that at an unexpected moment, the apparatus being no longer able to maintain its position, gives way, thereby producing lamentable results. An apparatus should, then, in order to be well and constantly adjusted, undergo numerous modifications, the most indispensable among which I will herein-after enumerate. I will first describe the mechanical arrangements which I make use of for answering all requirements, still observing that all are progressive in their action, or, in other words, operating by degrees. The necessary movements for a plain truss are thirteen in number, namely; 1st, mobility of the dorsal pad on the loins in every direction, Sheet 3; 2ndly, elasticity of the dorsal pad, Sheet 3; 3rdly, elasticity of the pubic belt, Sheet 3; 4thly, facility of lengthening or shortening the connecting parts of this belt, Sheet 3; 5thly, extension of the spring on the back part, Sheet 3; 6thly, shortening the same spring on the back part, Sheet 3; 7thly, increasing the power of the spring, Sheet 3; 8thly, lengthening the spring on the front collar, Sheet 3; 9thly,

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shortening the same on the front collar, Sheet 3; 10thly, inclination of the pad to facilitate the fitting thereof on the hernial ring, Sheet 3; 11thly, reversing the pad for obtaining a slight compression towards the pubis for the purpose of preventing the slipping out of the hernia, Sheets 1 & 2; 12thly, the drawing back of the pad so as to compress the abdominal parietes for the purpose of preventing any intrusion of the hernia within the channel, Sheet 3; 13thly, elasticity of the pad, Sheet 3. The following are the nine movements for a double truss; they are exactly similar to those first described, excepting the movements indicated under the Nos. 1, 2, 3, 4, which are the same both in plain and double or complex trusses.

I will first describe the movement No. 1, Sheet 3. The dorsal pads are at present secured by means of a screw which, in case the spring is badly supported on the fore part, will cause the pad which bears only on one part to rest on a defective fulcrum, thereby producing a painful pressure on the lumbar parts and even scoriations. Further, the fixing of the dorsal pad to the spring prevents its following all the motions of the body; the screws may besides get loose and be lost and would require an expense for repair, as the dorsal pad will for this purpose require fresh stuffing. Fig. 16, Sheet 3, shows the various arrangements which I have contrived in order to render the pad movable on the leather piece 1. I fix a metal disc 2, at the centre of which is a hole having an interior worm 3, and into which are screwed the back ends of the springs. By this arrangement it will be readily understood that the dorsal pad is constantly applied flat against all the parts of the body and rests on and follows all its movements, which has never before been attained to this day.

The movement No. 2 described.—In order to obtain the elasticity of the dorsal pad, or in other words, to allow of its being distended by any motion of the body, tending to increase its size about the hips, in the act of sitting down, for instance, an inconvenient amount of compression is undergone by the wearer when using the ordinary truss, which compression besides cannot be prevented, as in a standing posture the same compression would prove insufficient. According to the improvement of this Invention such inconvenience ceases, as the trusses distend as the patient sits down, and reassumes its normal position when the patient is standing. For obtaining this movement I make use of two discs, which I connect together either by a spiral spring, shown in red outlines, Fig. 16, or by an india-rubber band or tube fixed to both ends.

The movement No. 3 described.—Fig. 19 shows the pubic elastic belt intended to be applied radially to the dorsal pad. This elasticity of the pubic

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belt is obtained either by means of a round or flat spiral spring, or by means of an india-rubber band or tube connected to two pieces of leather, or to a small steel rack piece, which is illustrated in Figs. 20 and 21. The two ends may also be either small leather bands or rings, or any other suitable arrangement may be adopted. By this means a powerful compression of the belt 5 on the end of the pad is obtained.

The movement No. 4 described.—This movement is obtained by means of holes formed at certain distances from each other in leather bands or small steel plates.

The movement No. 5 described.—To obtain the lengthening of the spring, 10 the end of the back part is wormed, as also are the two discs fixed to the dorsal pad, Fig. 16, before described, with reference to movements Nos. 2 and 3. The truss is adjusted on the wearer towards the middle part of the screw thread, so as to permit of its being extended nearly an inch on both sides, should any circumstance whatever require it. 15

The movement No. 6 is the same as movement No. 5.

The movement No. 7 described.—To obtain an increase or diminution of spring power, and to act upon the circumference of the latter, I proceed as follows:—The end of spring 16, Fig. 23, is hinged at 15 to the screw rod 17, formed with a projection 18, into which takes a screw 19; the end of which 20 bears upon the spring, and causes the latter to turn in either direction, and imparts to the projection 18 a slight movement, which influences the pads so as to bring them nearer together, or extend them farther from each other, and thus increase or diminish the circumference of the spring. Instead of causing the screw to pass through projection 18, it may take into the spring, and in 25 this case its end would bear upon a projection formed on the screw rod, which would answer the same purpose. As shown at Fig. 22, the screw rod and ring may be furnished with a part 21 wormed inside, so as to admit a screw 22, either straight or slightly curved. A sliding spring, Fig. 24, would by varying its position produce an equally effective result. 30

The movement No. 8 described.—In the sheath *o*, which is wormed internally, I introduce the wormed end N of the spring, in order to secure it when the desired length is obtained; on the wormed part I arrange one or two parts for the screws to bear upon, or, which is preferable, a groove is made throughout the whole length of the worm large and deep enough to admit 35 the end of the screw P, Fig. 1; a similar arrangement may be employed for the extension of the spring by the end of the latter being wormed internally, into which is introduced a corresponding screwed part fixed to part 12, as shown, Fig. 2.

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The movement No. 9 is the same as that described at No. 8.

The movement No. 10 described.—The inclination of the pad has been hitherto effected by means of an elbow joint, consisting of a ball and socket, the result of which means were first to effect said inclination with a jerk, besides which it only permitted of a limited inclination, and as regards the compression of the inguinal channel by means of the joint aforesaid, it would frequently happen that the end of the pad rested upon the end of the inguinal channel leaving the passage of the internal ring free, besides that it allowed the groin too voluminous dimensions for apparatus of this description; and, further, this apparatus was destitute of the means of being fixed. This inclination I obtain by means of gearing, A, B, Fig. 1, and I secure it when once adjusted at the desired point by means of screws C, D, which press on each side of the teeth, as shown at Fig. 1, Sheet 3. Fig. 2 shows an arrangement with one toothed segment, the teeth of the remaining one being made longer and stronger, so that the screws shall answer the same purpose as in Fig. 1. Fig. 3 shows another arrangement, in which the gearing is dispensed with altogether, and instead of which I apply a disc E thinned round its periphery, upon which act two set screws F. G. I may likewise punch holes in the cheeks of the disc in the manner shown in Fig. 4, and it will suffice in this case to introduce one or two screws, which entering the holes will bear on its surface. Fig. 5 shows a screw H engaging a nut I hinged to the rod K of the pad by causing the said screw to turn in either direction, the depression or the raising of the pad is readily obtained.

The movement No. 11 described.—When the pad is properly fitted to the exact part of the hernial ring it should be capable of being reversed, in order to exert a pressure on the pubic, so that the hernia can be prevented from sliding into the scrotum, and also to permit of its tight applications to any individual, whatever may be his conformation. Thus, for a fat person the pad must be entirely reversed, while it should be nearly straight for a thin one. The various progressive reversing movements are illustrated in Sheets 1, 2, Figs. 1, 2, 3, 4, 5, and 6.

The movement No. 12 described.—I have found from experience and practice that different descriptions of pads should be adopted according to the nature of hernia to be treated, and made of different thicknesses. To this end, I have contrived a compressing pad, which has the advantage of admitting of a variation in thickness, to the extent of rather more than an inch, and so that the stuffing or padding thereof never presents any looseness or slack, but always compresses in a regular manner the abdominal parietes. Figs. 6, 7, 8, 9, 10, 11, and 12, show separately these compressing parts ready

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set up. The plate R of the pad is formed with a hole, through which passes a screw S, secured to the plate by the nut T, without interfering with its rotation; this screw moves in a cylinder U, wormed internally, at the upper part of which is maintained and turns freely the cap V. To allow of the cylinder U moving upwards without turning, grooves are formed on two 5 opposite sides thereof, into which fit the pins X on the socket Y, which is secured to the plate R. It will be understood that by turning the knob of screw S the screw is started, and the cylinder U and its cap thereby raised.

The movement No. 13 described.—The description of No. 12 may apply 10 to this movement, except that the cap is fixed to the end of the spiral spring, Fig. 15, while by means of the cylinder U, Fig. 6, the slack or sinking of the pad can be limited by making the cylinder of suitable depth. In order to give the compressing pad in this system all the desired elasticity, I cover the cap with some elastic substance, enclosed in a vulcanized india-rubber covering, or 15 as shown in Fig. 5, in an air-tight vulcanized india-rubber covering, so that a constant pressure may be obtained, owing to the elastic agents, viz., the truss spring, the spiral spring, the elastic stuffing material, and the pubic elastic curve. These two systems of pads have the advantage of assuming when distended a somewhat conical form, which has for result to limit the pene- 20 tration of the pad into the hernial ring, and prevents besides the introduction of the hernia into the scrotum. Instead of the cap V, Fig. 6, a plate hinged next the collar may be substituted, which may be increased or diminished in size by means of the cylinder U, Fig. 6.

The apparatus above described may be readily established so as to be quite 25 imperceptible, in the manner illustrated in Sheet 2, Fig. 11; but as its high price would render it inaccessible to workmen and professional people, I have devised a new means of stuffing these apparatus, and of cutting and sewing them mechanically, quite as strongly as could be done by manual labour. In order to make this improved method of manufacture better under- 30 stood, I shall refer to Sheet 4, the various Figures of which represent the different improvements in the pads thus obtained by means of sewing machinery. I proceed as follows, viz., I take a chamois or other skin, which I dress, size, and afterwards stretch and nail or otherwise fix on the boards A, as shown at Fig. 1. This sizing or dressing is intended to impart to the skin, as it does to 35 other fabrics and tissues, a rigidity which makes it suitable to be worked by sewing machinery, and I do not claim, therefore, the material whereby this result is attained, as any suitable compound usually employed for dressing fabrics and tissues of all sorts may answer the purpose; hemp, cotton, cloth,

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paper, or any other lining, may also be applied on the skin, the whole being dressed in the same manner to impart rigidity to the skin, which dressing, however, may be dispensed with if the expense be an objection. As regards economy this dressing process is very important, for the skin thus dressed and
5 stretched is lengthened about a fifth, which would prove of great advantage when operating on a large scale. The skin thus prepared is cut into strips as usual to form the different parts of the truss, and before submitting it to the action of the sewing machine I proceed in the following manner:—I take a plate of metal, wood, hardened india-rubber, horn, gutta percha, or other rigid
10 substance, which I enclose or cover, as shown at Figs. 2 and 3, Sheet 4, with chamois skin after cementing the two edges by a thread, and thus forming the laps, which, owing to the previous dressing the skins have undergone, will readily be made secure. I form the pad in the same manner by introducing one, two, three, four, or more pieces of wool, cotton, or other stuff, of suitable
15 form. This method of stuffing is far easier and more regular than by superposing layers of wool or other materials as usual, the regularity of which layers can never be well ensured, besides, the truss spring being, after the sewing operation, lodged between two layers of thick material, is more efficiently preserved against the effects of oxydation.

20 It will be easily understood that for invisible trusses the strips of skin may be replaced by some waterproof material such as waxed or gummed taffeta, india-rubber, or other suitable tissue, either impervious or otherwise. The cloth and stuffing materials are then superposed as usual, and as shown at Fig. 4, and afterwards submitted to the action of the sewing machine. The
25 rigidity, however, imparted to the skin by the dressing operation, which facilitates the work in a great measure does not suffice for obtaining a regular stitch, as the strokes of the foot presser and feeder work so as to form a very irregular stitch, according to the different thicknesses of the skins to be acted upon. I prevent this by using the mechanical arrangement shown at Fig. 5.

30 I fix in any suitable manner upon the sewing machine a small cylinder C, under which I pass a belt D, one end of which is connected to the truss pad while the other end carries a weight F, by the constant action of which the work is easily drawn, so that the stitch formed may always be of equal length, and preventing all puckering of the skin under the action of the machine, as would be in-
35 variably the case when operating without the aid of said device. The same contrivance may be applied to all sewing machines not only for the purpose above specified, but whenever long stitches are required to be formed on broad slightly resisting fabrics. Every one of the improvements described, however simple they may appear to be, are indispensable, and they enable me to

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manufacture trusses by machinery, which has never yet been attained hitherto. In order to facilitate the insertion of the double springs into the pads, I introduce them before screwing the knob on that part of the spring which has previously been backed with a wormed counter plate.

I will now proceed to describe the improved mechanism for drawing in the front pads of the truss by degrees, whereby they may be varied in thickness and length some fractions of an inch. I further apply the same drawing in mechanism to other similar apparatus, such as pessaries, for instance. Sheet 4 of the Drawing annexed, represents an improved pessary, for producing the instantaneous return of the basin. 5 10

This apparatus presents great advantages over those usually employed. Fig. 9, Sheet 4, shows the apparatus in red outlines, as it is being introduced, and in black lines when in its normal position. Fig. 10 indicates in horizontal section the position of the mechanism, and Fig. 11 shows the form of the hinges, which permits of the basin assuming the position required for facilitating the insertion. The basin A, which may be of india-rubber hardened or otherwise, porcelain, boxwood, ivory, silver, or other suitable substance, is carried by a collar B, to which are fitted hinged rods C; but this connection of the basin to the rods C may be otherwise effected, thus rendering the motion of the basin easier at this part. The rods C engage in grooves provided for the purpose, between movable part D and stationary cover E; the movable part D is wormed internally, so as to admit a screw F, whose rotation in either direction produces the raising or depression of said part D. In order to prevent this part from turning with the screw, I form it with two longitudinal grooves, in which gear two screws, while a small projecting edge is formed on part E, which works in the two grooves. The other two screws K engage in the flat parts of the hinged rods, which are provided for that purpose at their ends with a projection, so that the two screws K prevent the rods from escaping. Other systems of pessaries have been before made, which, although inclining, for the purpose of rendering the insertion easier, can only be reversed very slowly, which I have endeavoured to improve. The horizontal position is somewhat difficult to obtain, as the part where the apparatus is laid cannot be observed, and it may occur that, owing to a wrong inclination, the uterus may be badly directed, in which case the apparatus will prove rather hurtful than useful. An experienced practitioner may object, perhaps, that this position may be well regulated by hand; supposing this to be true, which is not quite my opinion, yet in most cases it happens that the wearer is incapable of properly performing said operation; to remedy which I cause the basin to return of itself to its original position at 15 20 25 30 35

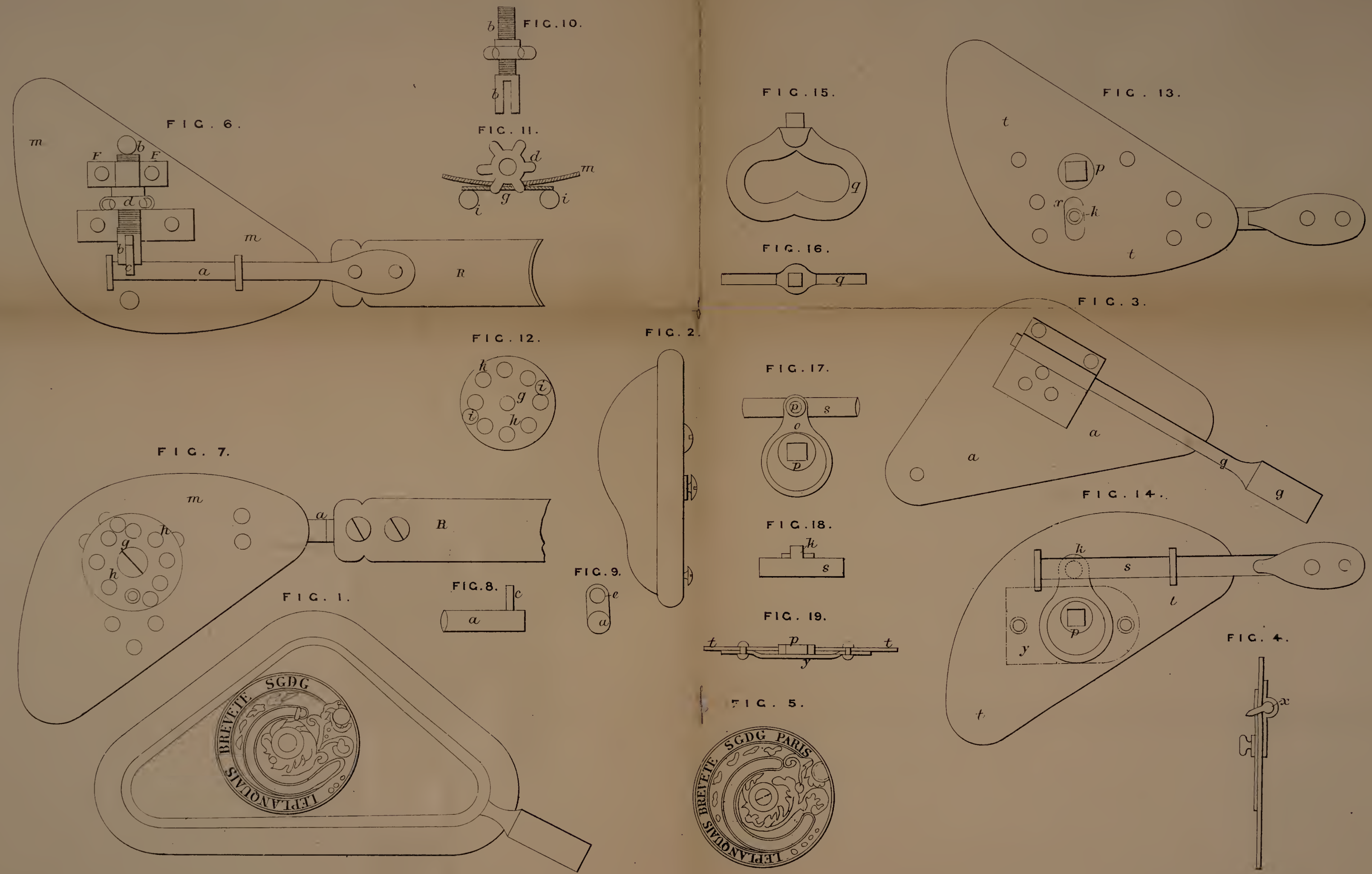
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once. For this purpose I arrange on the collar B, and opposite to each other two elastic cords M, or two india-rubber tubes, or, it may be, one or more straight or spiral springs, by whose action the basin is returned to its normal or horizontal position from the vertical position it had assumed, in order to
5 facilitate its introduction as indicated by the red outlines, Fig. 9, so that any one can readily apply this pessary in its right place.

The basin once in position may be afterwards raised at certain periods as the cure progresses, by means of the arrangement which I have before described for hernial pads. This reversal of the basin may likewise be obtained by
10 means of a non-elastic spring cat-gut, or by means of a flexible plate of metal, one part of which not in connection with the basin, passes as represented at Fig. 10, through a hole made in the plate for the purpose; and I may also apply the same mechanical arrangement as described, to apparatus for appli-
cation to the rectum, and to umbilical apparatus, with such modifications in
15 size as may be desirable for suitable application thereto.

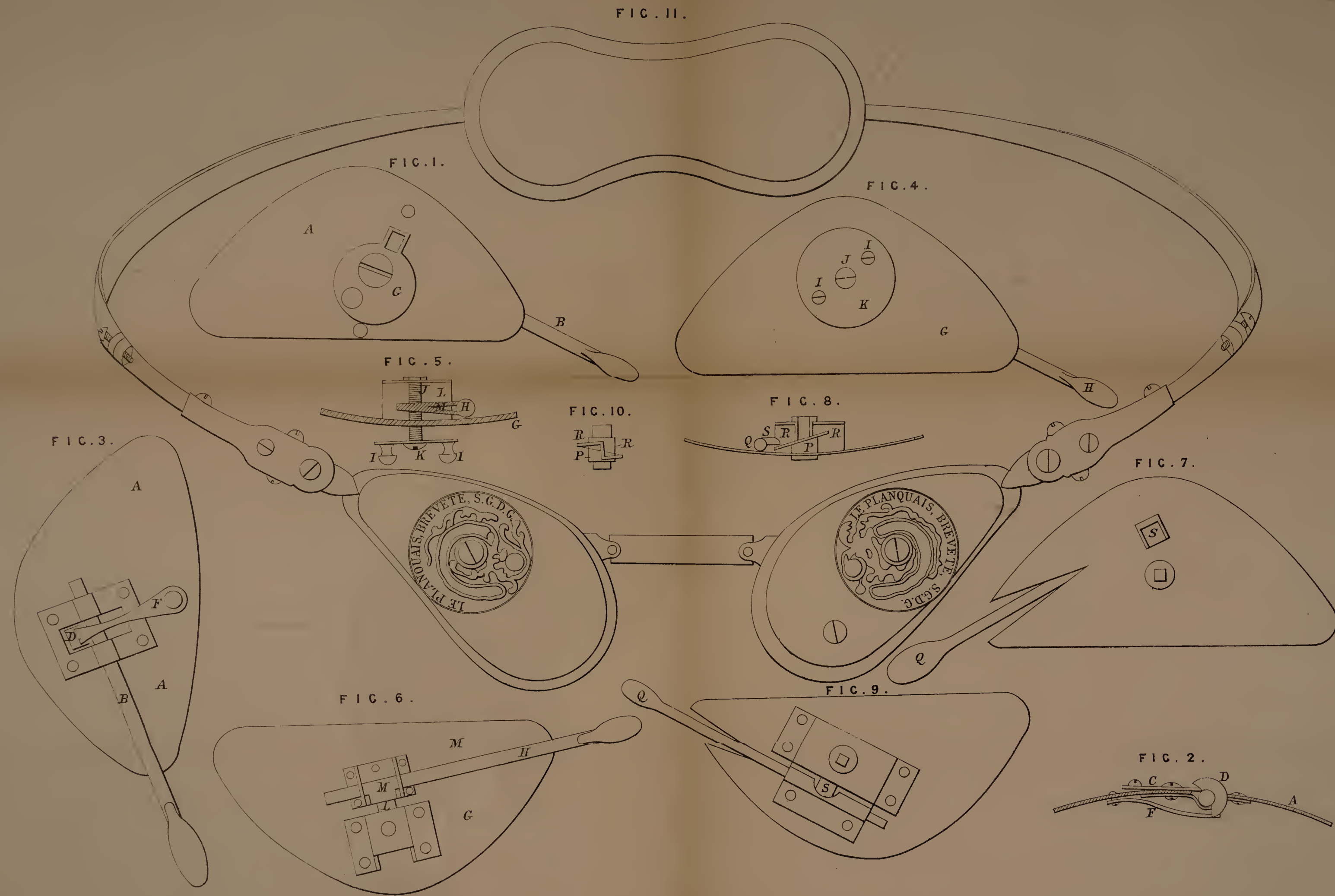
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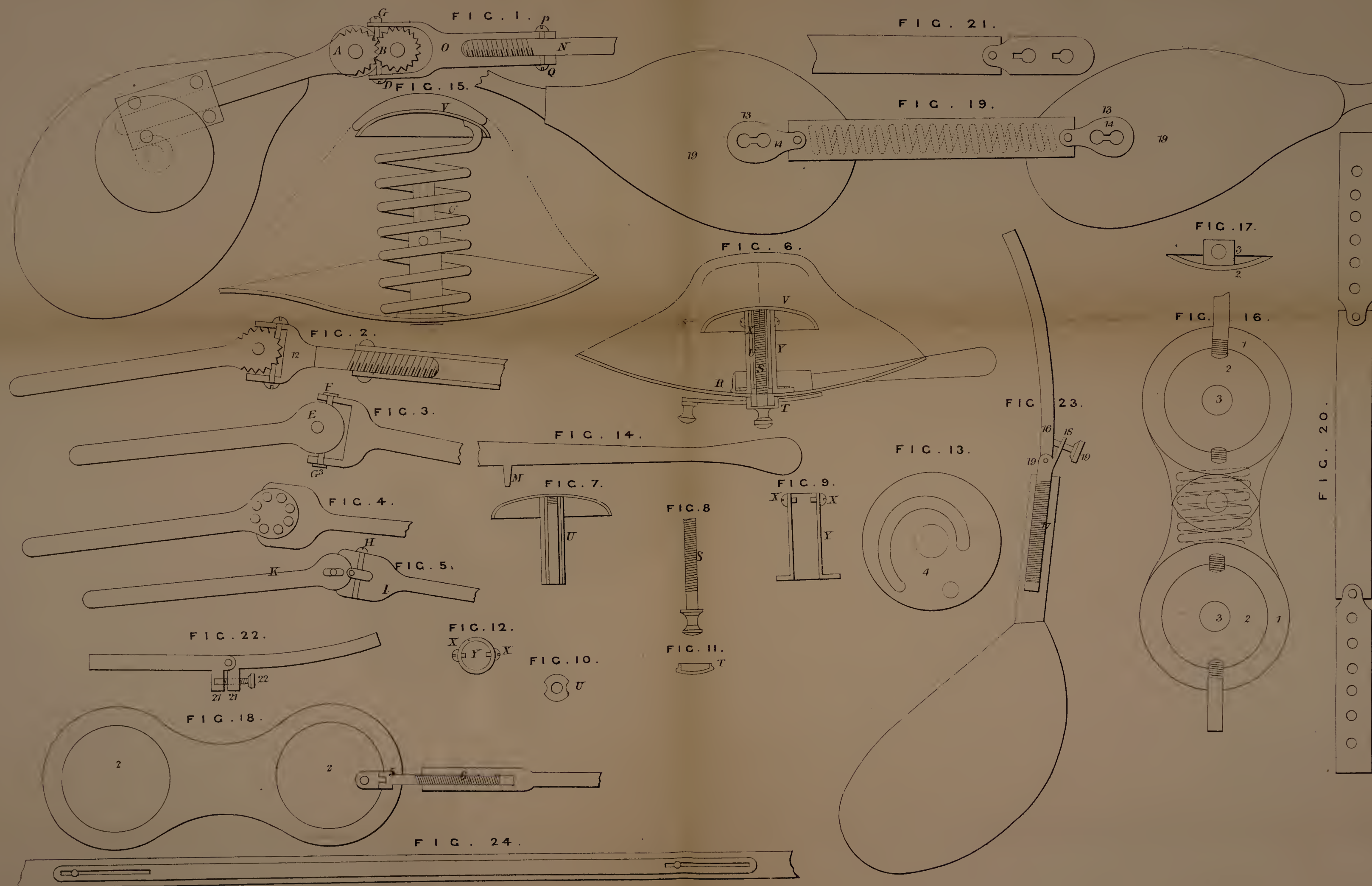
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Drawn on Stone by Malby & Sons.



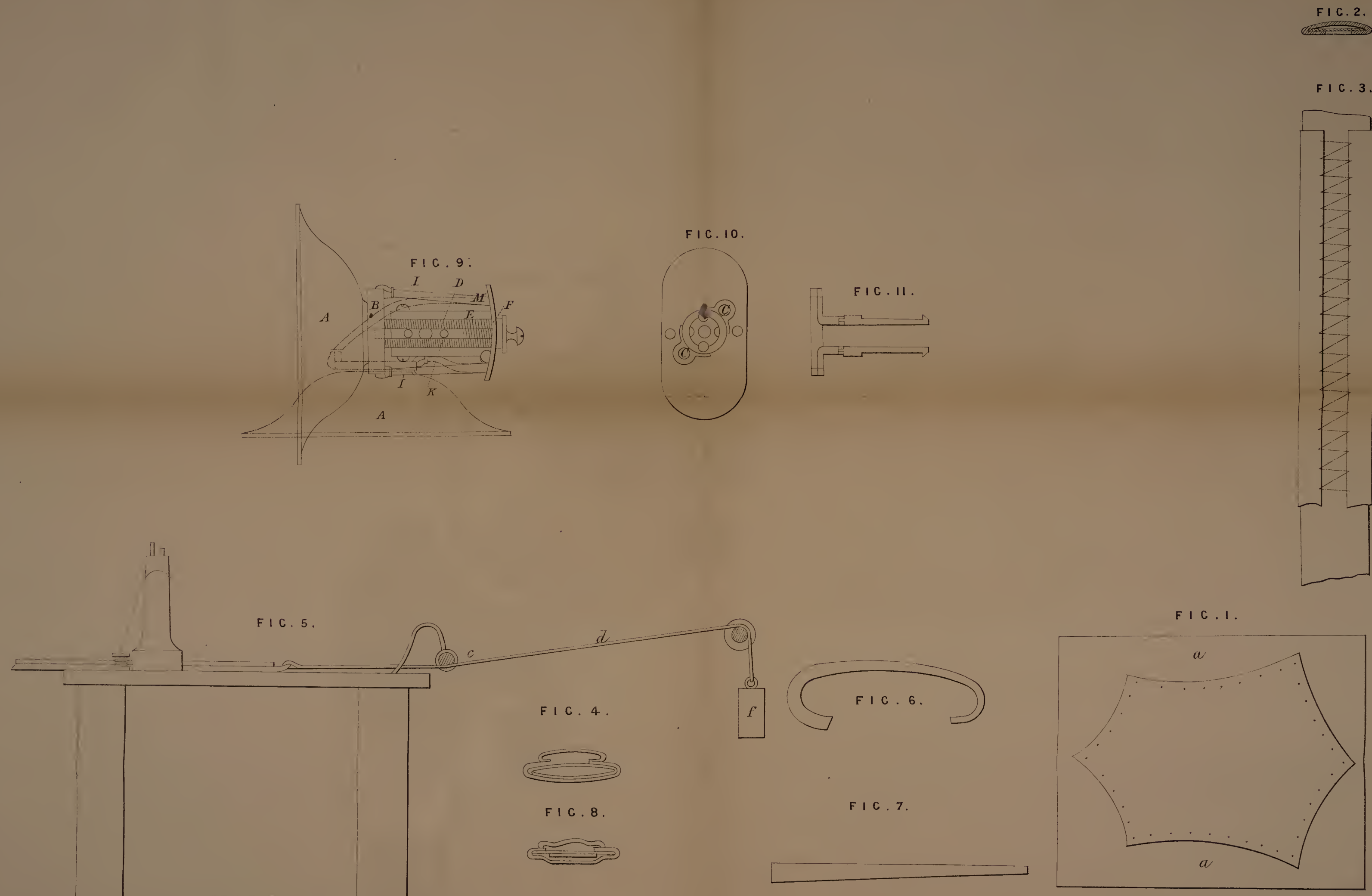
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